

CLAIMS

[1] A metal spinning method for forming a work of a metal sheet by pushing the work onto a rotating mandrel using a forming roller,

5 the metal spinning method comprising the steps of:
 driving actuators of the forming roller with feedback signals from a force sensor fitted to the forming roller, to control the pushing force of the forming roller; and

10 forming the work following the cross section shape of the mandrel, so that the product having the non-circular cross section normal to the axis of rotation can be formed.

[2] The metal spinning method as set forth in claim 1,
15 wherein

 the motion of the forming roller in the forming operation is stored;

 the shape of the mandrel near the point of the forming roller contacting with the work is estimated
20 based on the motion of the forming roller from a time point before one rotation of the mandrel; and

 according to the estimation, the rotational speed of a motor for rotating the mandrel is controlled for the forming operation.

[3] The metal spinning method as set forth in claim 1,
wherein

a jig shaped to merge into the front surface of the
mandrel is used to clamp the work fixedly between the
5 mandrel and the jig; and

the forming roller is fed at first in the direction
of the axis of rotation of the mandrel while being pushed
onto the jig, so that the forming operation of the work
is smoothly started.

10 [4] A metal spinning apparatus comprising:

a forming roller having a force sensor fixed thereto,
and

actuators for driving the forming roller, wherein

the actuators drive the forming roller to spin a
15 work of a metal sheet by pushing the work onto a rotating
mandrel;

the actuators control the pushing force of the
forming roller with feedback signals from the force
sensor; and

20 the forming roller forms the work following the
cross section shape of the mandrel, so that the product
having the non-circular cross section normal to the axis
of rotation of the mandrel can also be formed.

[5] The metal spinning apparatus as set forth in claim 4, wherein

the motion of the forming roller in the forming operation is stored;

5 the shape of the mandrel near the point of the forming roller contacting with the work is estimated based on the motion of the forming roller from a time point before one rotation of the mandrel; and

according to the estimation, the rotational speed
10 of a motor for rotating the mandrel is controlled.

[6] The metal spinning apparatus as set forth in claim 4, further comprising:

a jig shaped to merge into the front surface of the mandrel and capable of clamping the work fixedly between
15 the mandrel and the jig; and

the forming roller is fed at first in the direction of the axis of rotation of the mandrel while being forced onto the jig, so that the forming operation of the work is smoothly started.